P-CMT-3001   Seat No. _____

M. Sc. (Sem. III) (CBCS) Examination

May/June – 2018

Mathematics : CMT-3001

(Programming in C & Numerical Methods)

(New Course)

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instructions :   (1)   Answer all the questions.

                 (2)   Each question carries 14 marks.

1   Answer any seven :   **7×2=14**

     (1)   Give definition of flow-chart and draw flow-chart to print 1 to 100 integers.

     (2)   Write down characters whose ASCII codes are 101 and 66.

     (3)   Give definitions of program and compiler.

     (4)   Write a program which can print integers 10 to 1 in column form.

     (5)   Give definition of identifier and write down two reserved identifiers.

     (6)   Determine value of followings
(when a = 15, b = 50, c = –35)

         (1)   a > b && a + c = = b

         (2)   b% a + c

     (7)   Write down four names of (six) C-Tokens.

     (8)   Write down four names of data types.

2   Attempt any two :   **2×7=14**

     (a)   Write a note about development of C language.

     (b)   Explain about if......else statement and using it write down a program which can find a smallest number from given two numbers.

     (c)   Explain about while loop and using it write a program which can display 200 to 101 integers.

     (d)   Discuss about recursion of a function in itself by an appropriate program.

     (e)   Discuss about false possition method.

3 Attempt any one :   1×14=14

    (a) Write a program which can solve linearly independent system AX = B of size n by Gauss Elimination method.

    (b) Explain N-G forward interpolation polynomial and derive the formula

$$p(x) = f_1 + \frac{\Delta f_1}{h}(x - x_1) + \frac{\Delta^2 f_1}{h^2 \times 2!}(x - x_1)(x - x_2) + ...+$$

$$\frac{\Delta^{n-1} f_1}{(n-1)! \, h^{n-1}}(x - x_1)(x - x_2)....(x - x_{n-1})$$

Using this find the formula for an unknown function f given by followings

x	0	1	2	3	4	5
$f(x)$	−2	−3	−2	1	6	13

    (c) Explain Gauss Elimination method and using it solve the following system of equations :

$$x_1 + x_2 + x_3 + x_4 = 25$$
$$x_1 + x_2 + 4x_3 + 5x_4 = 50$$
$$2x_1 + 3x_2 + 4x_3 + 5x_4 = 75$$
$$x_1 + 4x_2 + 16x_3 + 64x_4 = -35$$

4 Attempt any two :   2×7=14

    (a) Write a program which can read date, month and year of 21 century and it can declare associate day of the date (assuming 01-01-2001 is Monday)

    (b) Write a program which can display first 200 primes 2, 3, 5,....,1223.

    (c) Explain Lagrange interpolation polynomial and derive its formula

$$p(x) = \sum_{i=1}^{n} f_i \prod_{\substack{j=1 \\ j \neq i}}^{n} \frac{(x - x_j)}{(x_i - x_j)}$$

5 Attempt any two : **2×7=14**

    (a) Write a program which can display tables of 11 to 20.

    (b) Write a program for N-R method.

    (c) Write a program which can read two square matrices of order n and it can find the product of given two matrices.

    (d) Discuss about secant method.

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